



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

$$\therefore \frac{1+at+bu}{\sqrt{[1+a^2+b^2]}} = \frac{1+ct+du}{\sqrt{[1+c^2+d^2]}} = \frac{1+ft+gu}{\sqrt{[1+f^2+g^2]}} \text{ determines } t \text{ and } u.$$

$$e^2 = \tan^2 \theta = \frac{(t-a)^2 + (u-b)^2 + (au-bt)^2}{(1+at+bu)^2}, \quad e_1^2 = \frac{(t-a)^2 + (u+b)^2 + (au+bt)^2}{(1+at-bu)^2},$$

$$e_2^2 = \frac{(t+a)^2 + (u-b)^2 + (au+bt)^2}{(1-at+bu)^2}, \quad e_3^2 = \frac{(t+a)^2 + (u+b)^2 + (au-bt)^2}{(1-at-bu)^2}.$$

145. Proposed by FRANK GIFFIN, Graduate Student, State University, Boulder, Col.

If A and B be the points of contact, upon two circles X and Y , of tangents drawn from any point of their circle of similitude, then the tangent from A to Y is equal to the tangent from B to X . [From *Casey's Sequel to Euclid*, Part I., page 144.]

Solution by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

Let P be any point on the circle of similitude, AP, BP the tangents from P to X and Y , respectively. AD, BC the tangents from A and B to Y and X , respectively.

Let $AX=R, BY=r$. Let $AD=a, BC=b, AP=c, BP=d, PX=m, PY=n$.

$\angle APX = \angle BPY$ since P is on circle of similitude. $\therefore \angle APY = \angle BPX = \theta$.

Also, $c:d = R:r$. $\therefore d = cr/R \dots \dots (1)$.

$m:n = R:r$. $\therefore n = mr/R \dots \dots (2)$.

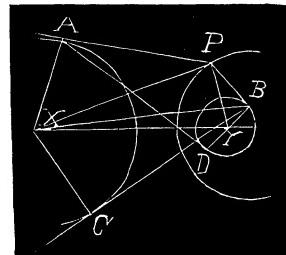
$$a^2 = AX^2 - r^2 = c^2 + n^2 - 2cn \cos \theta - r^2 \\ = c^2 + m^2 r^2 / R^2 - (2cmr/R) \cos \theta - r^2 \dots \dots (3).$$

$$b^2 = RX^2 - R^2 = d^2 + m^2 - 2dm \cos \theta - R^2 = c^2 r^2 / R^2 + m^2 - (2cmr/R) \cos \theta - R^2 \dots \dots (4).$$

$$(3) - (4) \text{ gives } R^2(a^2 - b^2) = (c^2 - m^2 + R^2)(R^2 - r^2).$$

$$\text{But } c^2 + R^2 = m^2.$$

$$\therefore a^2 - b^2 = 0. \quad \therefore a = b.$$



CALCULUS.

106. Proposed by M. C. STEVENS, M. A., Professor of Higher Mathematics, Purdue University, Lafayette, Ind.

$$\int_0^\pi \frac{\cos rx dx}{1 - 2\cos x + a^2} = \frac{\pi a^r}{1 - a^2}.$$

[Williamson's *Integral Calculus*, 6th Edition, page 174.]

Solution by WILLIAM HOOVER, A.M., Ph.D., Professor of Mathematics and Astronomy, Ohio University, Athens, Ohio.

In Todhunter's *Plane Trigonometry*, 3d Edition, Art. 309, we have

$$\cos \alpha + a \cos(\alpha + \beta) + a^2 \cos(\alpha + 2\beta) + \dots + a^{n-1} \cos[\alpha + (n-1)\beta]$$